Quantifying the Environmental Benefits of CRP on Prairie Wetlands: Separating Acts of Nature from Acts of Congress

U.S. Department of the Interior
U.S. Geological Survey

CRP: Planting for the Future
June 6-9, 2004
Fort Collins, Colorado

Acts of Nature

- Landscape Formation
  - Structural (e.g., volcanoes)
    - Intermountain Basins
  - Weathering (physical/chemical weathering)
    - Karst Topography (sinks, caverns)
  - Erosion/Deposition (glaciers, water, wind)
    - Prairie Potholes

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Acts of Nature

- Landscape Position
  - Elevation, Slope, Aspect
- Geomorphic Processes
  - Soils (texture, chemical composition)
  - Hydrologic Connectivity
  - Water Quality
- Climate
  - Precipitation, Evaporation, Temperature

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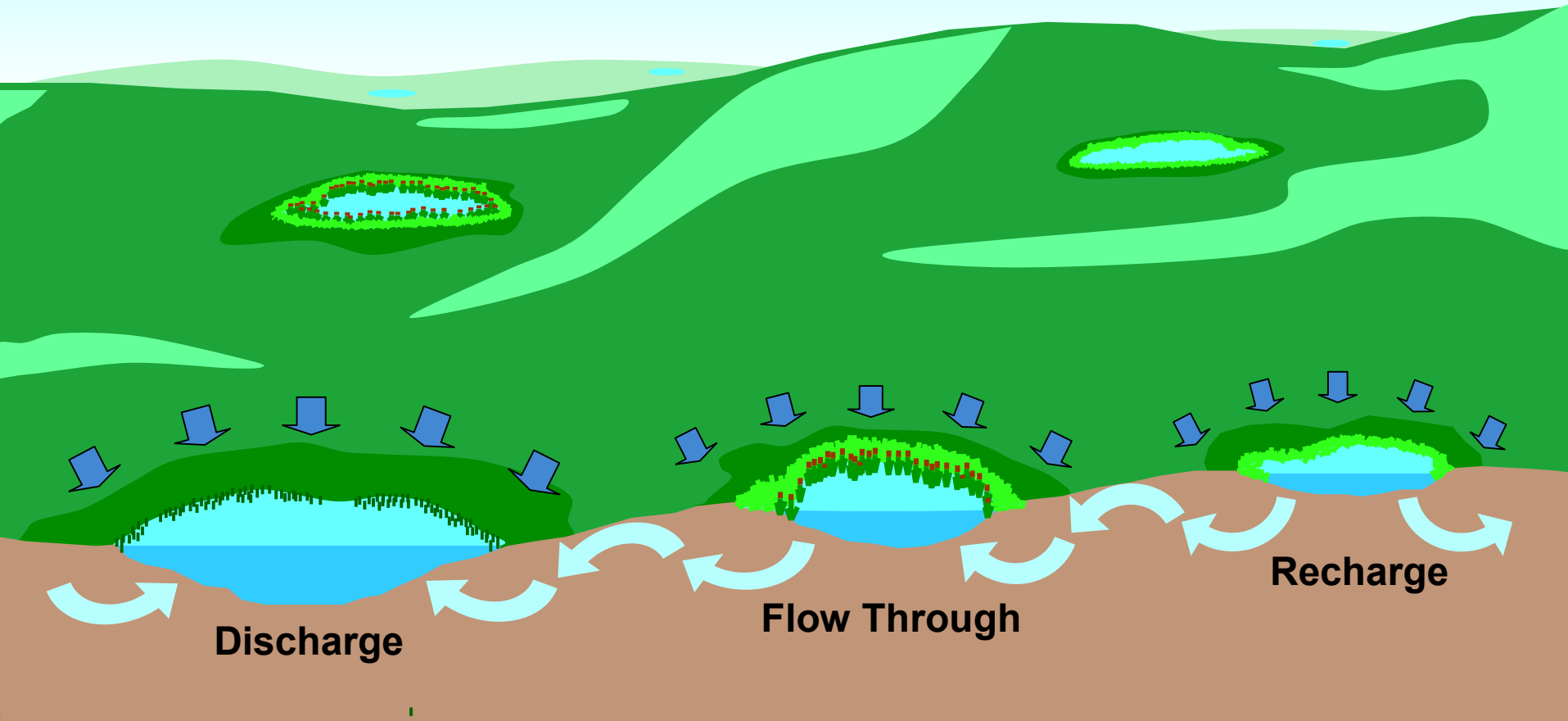
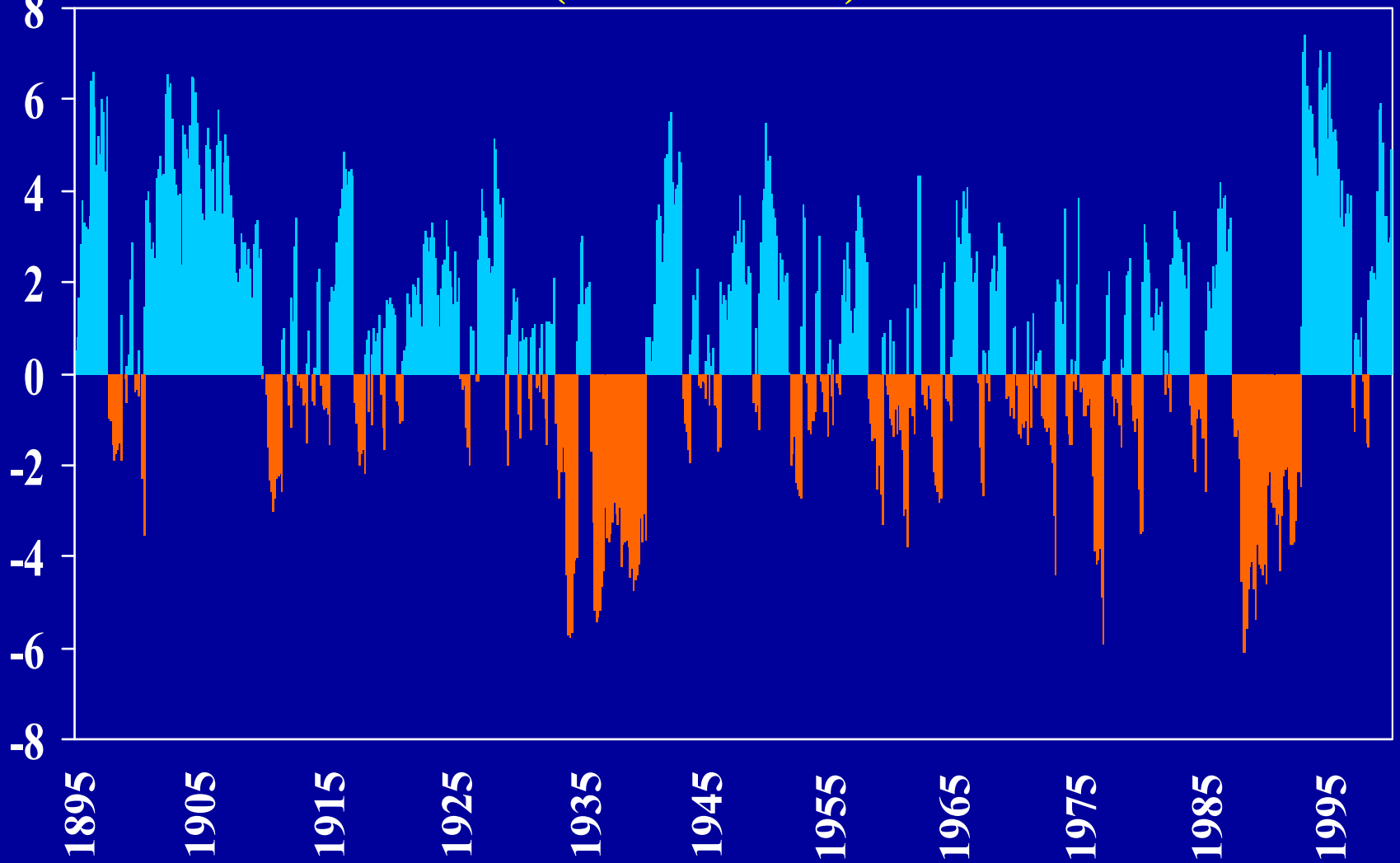
Wetland Hydrological Functions



Palmer Drought Severity Index, Division 5, ND (1895 to 2000)



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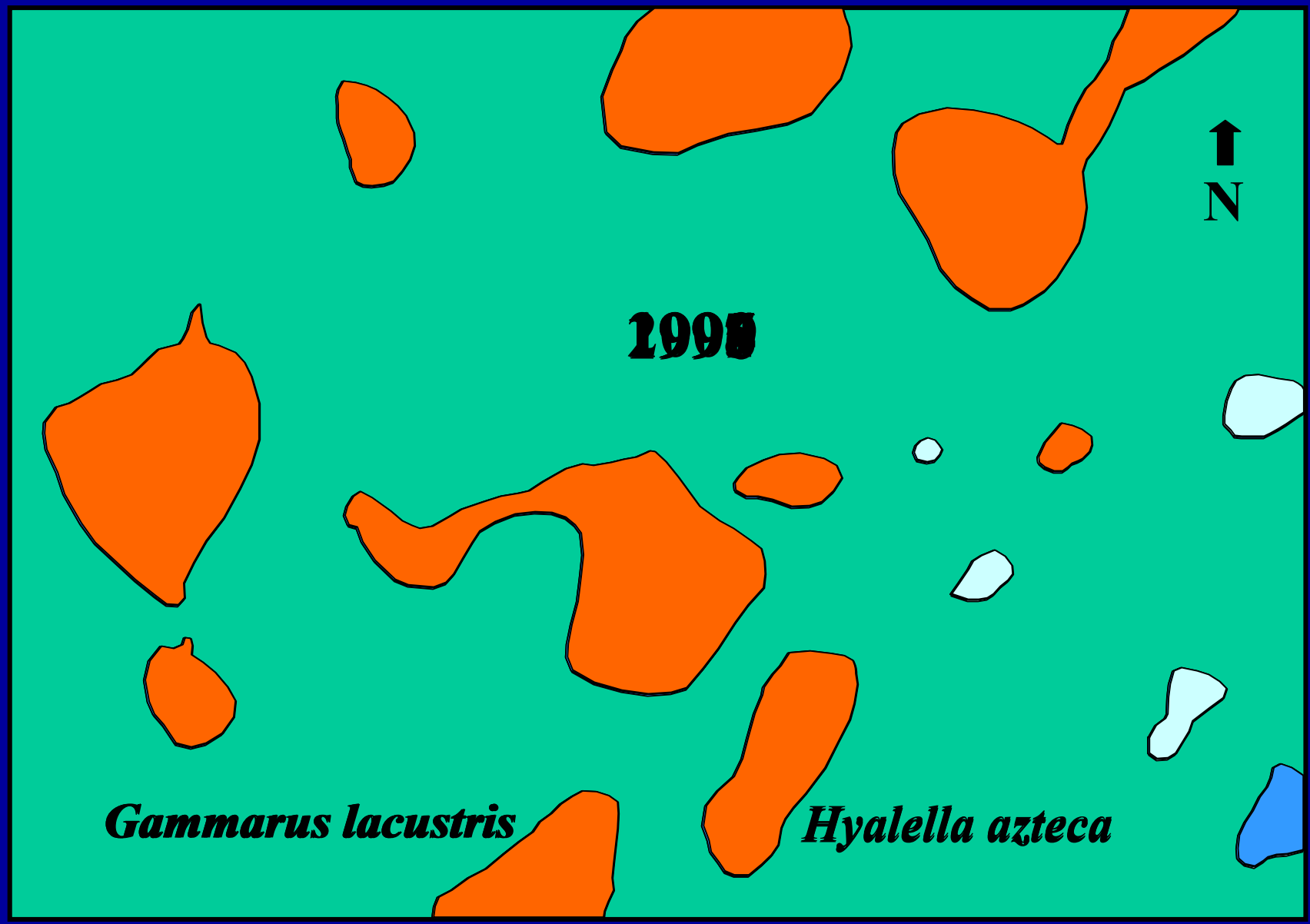
Amphipods in Cottonwood Lake Study Area Wetlands



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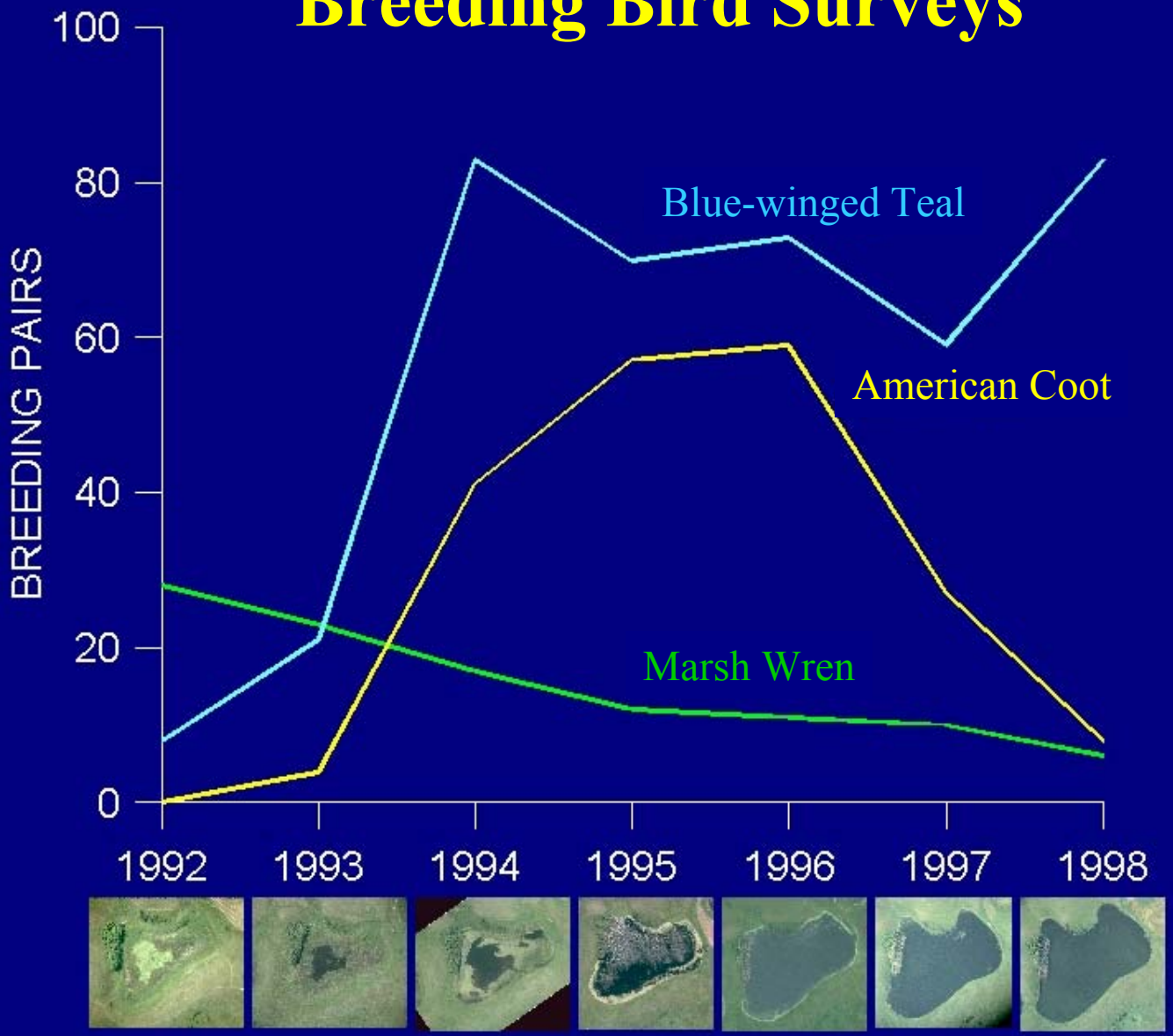
Breeding Bird Surveys



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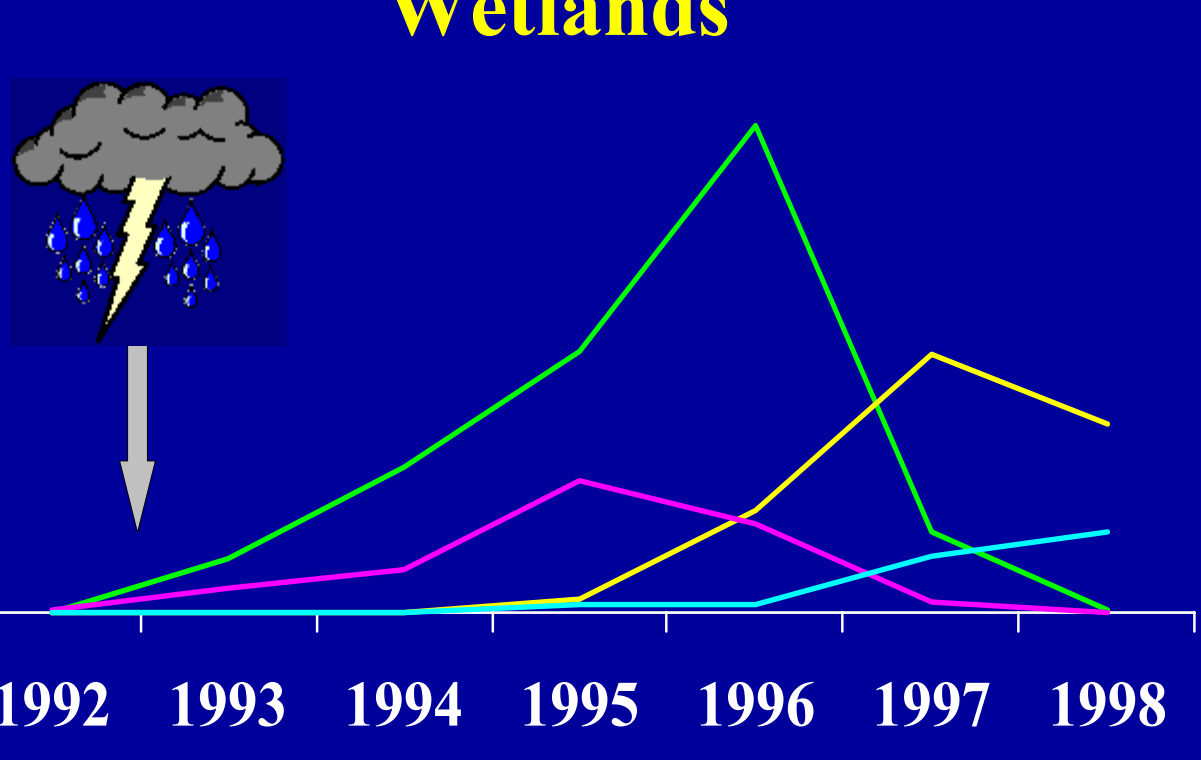
science for a changing world

Tiger Salamander Captures in Cottonwood Lake Study Area Wetlands



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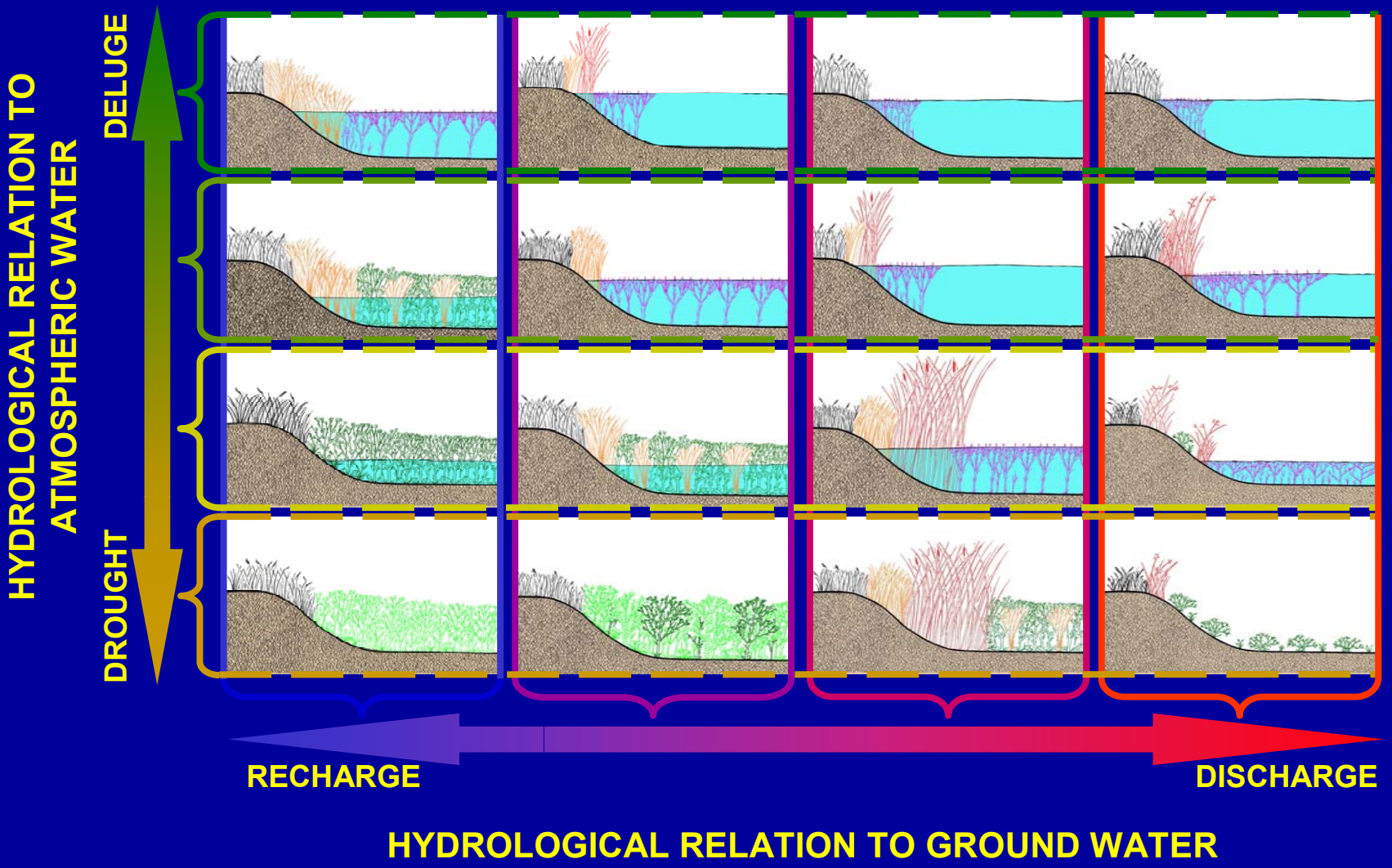
THE WETLAND CONTINUUM



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Acts of Congress

1849 - Swamp Lands Act

1934 - Migratory Bird Hunting Stamp Act

1954 - Water Protection and Flood Prevention Act

1972 - Federal Water Pollution Control Act (Sec 404)

1985 – Food Security Act

1986 – Emergency Wetland Resources Act

2001 – SWANCC vs USACOE

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Influence of Agricultural Practices on Wetland Functions

Grazing on Public Lands

Kirby, R. E., J. K. Ringleman, D. R. Anderson, and R. S. Sojda. 1992. Transactions of the North American Wildlife and Natural Resources Conference

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PHYSICAL FACTORS

Hydroperiod Fire Climate Topography

Dams/Levees

Agriculture

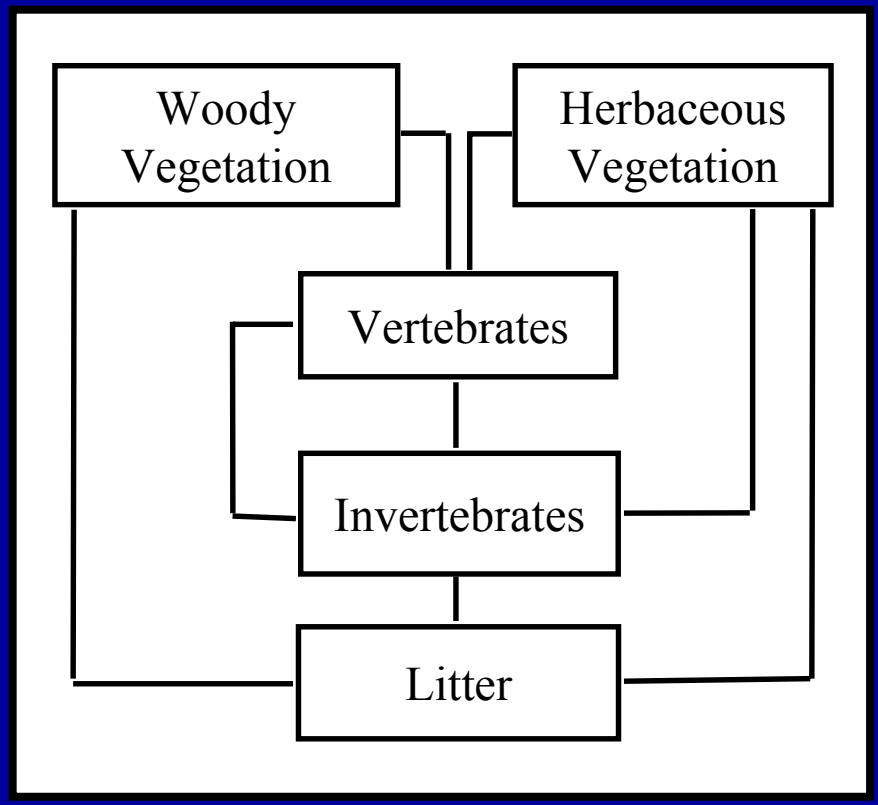
Climate Change

HUMAN IMPACTS

Pesticides

Roads

Sedimentation



Pathogens

Herbivory

BIOLOGICAL FACTORS

Parasites

Predators

Soil nutrients Water quality

CHEMICAL FACTORS

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Critical Information

- Ecosystem function in the prairie depend on synergistic processes involving both uplands and wetlands
- A single wetland can undergo dramatic changes in structure and function in relation to short- and long-term “acts of nature”
- Wetland processes can be influenced but not completely altered
- Processes influencing wetlands are interrelated; thus, any action intended to alter a specific wetland function may have unintended results

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Concept of Ecological Fit

The idea that the health and sustainability of ecosystems depends on how well "Acts of Congress" are coordinated with "Acts of Nature"

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Goal

- Long-term sustainable productivity and "health" of our Nation's ecosystems
- Improved criteria for selection and management to improve "Ecological fit"

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Impact of U.S. Department of Agriculture and U.S. Department of Interior Programs on Functions Performed by Restored Wetlands in the Prairie Pothole Region

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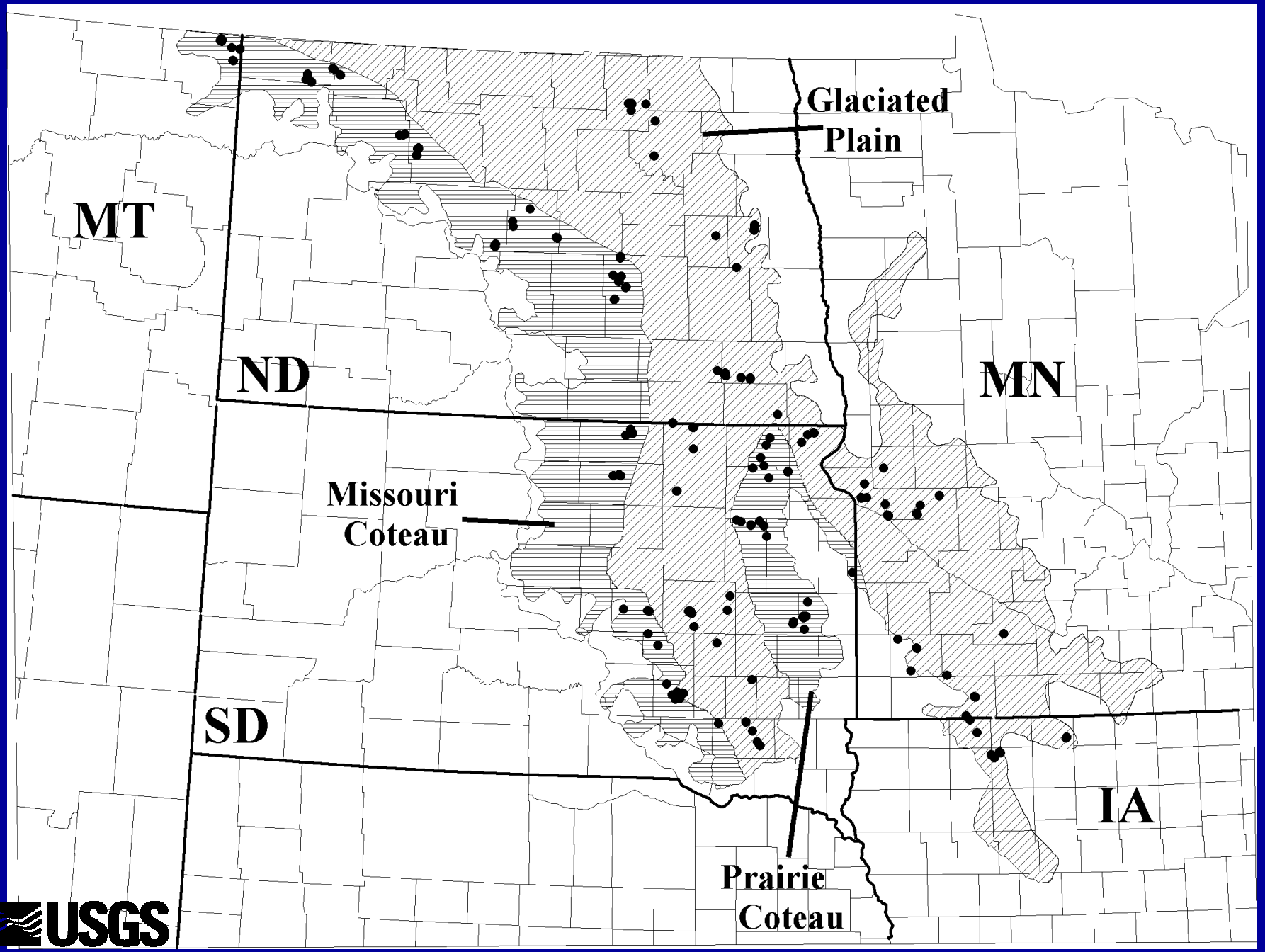
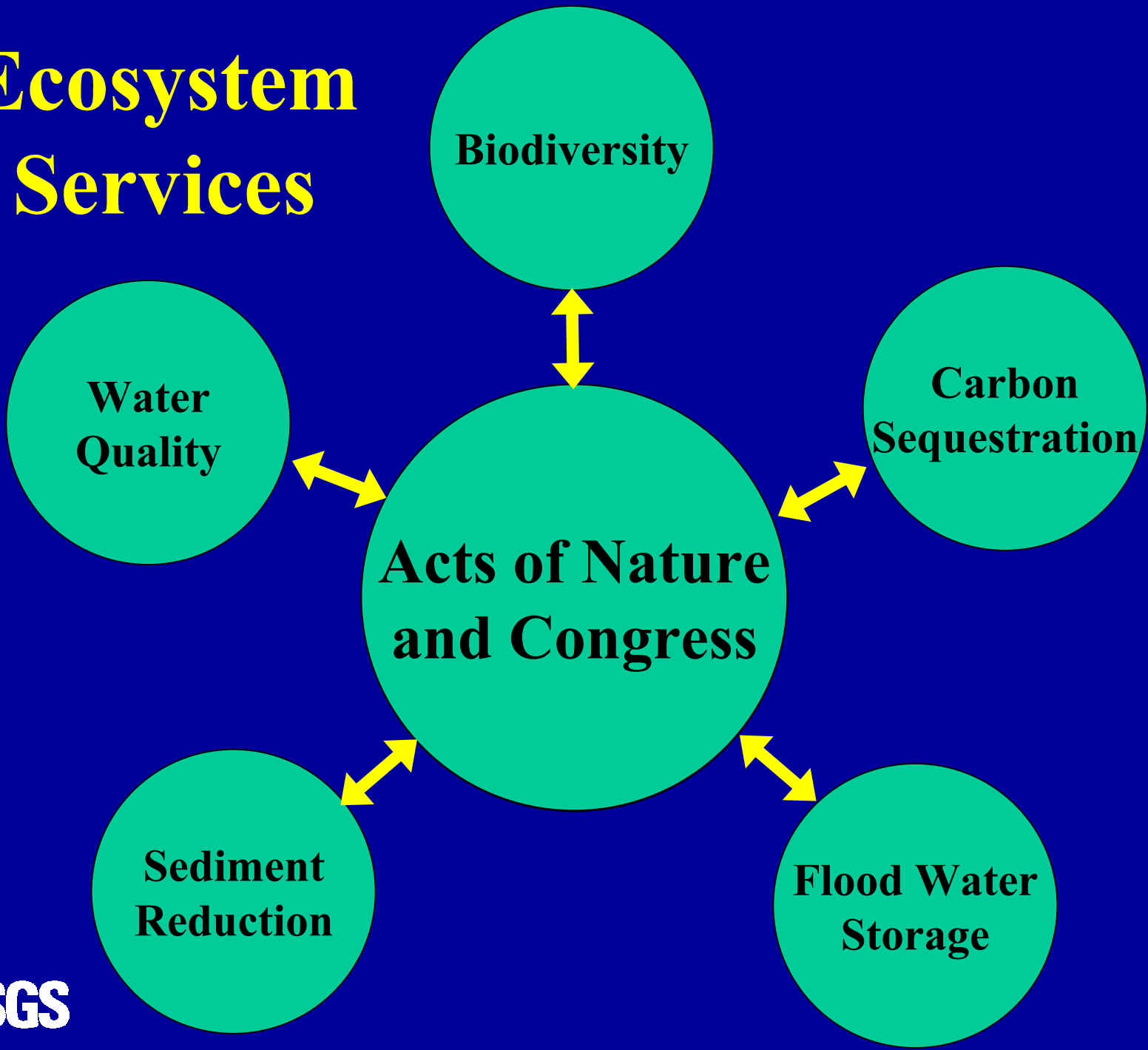

Glaciated
Plain
MT
ND
MN
Missouri
Coteau
SD
IA
Prairie
Coteau
USGS

Ecosystem Services



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